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EDITED BY J. HAY TAYLOR.

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Notes.

We have in type an interesting article by Mr. J. J. Briginshaw on "Polarized Light" in connection with the lantern, which has been crowded out of this issue.

* * *

Judging from the number of reports of various Christmas lantern entertainments that have lately reached us, it may safely be said that at no similar time of any past season have so many lantern exhibitions been given in small out-of-the-way villages as have been given during the past few weeks.

* * *

The Church Defence Institution, 9, Bridge Street, Westminster, have set to work to arrange a lantern lecture department. We learn that the minimum charge for the hire of a set of slides for one day will be 5s., plus 2s. 6d. for carriage.

* * *

There is a well-known story of an artist of standing who, when he had finished a painting of a pig eating, happened to ask a rustic, who was looking on, if he had any fault to find with it, when the latter simply asked—whoever saw a pig eating without putting at least one foot in the trough—so from unsuspected sources one often gains information. A short time ago in a village in the south of England the well-known slide of the carol singers was shown on the screen. In this slide there is a view of the front of a house, carol singers come upon the scene, the blind of the parlour is pulled up, disclosing a family party. The blind then goes down, and the next picture is projected. In the case referred to one of the audience called out, "What a mean family; they have not even given the singers a penny." A very little addition to this slide would greatly enhance its effect, and one of the singers could be made to approach the window, the window to open, the applicant to touch his hat, and rejoin the rest of the troup. This would give a certain amount of finish to the effect.

* * *

Mr. Jex Bardwell, of Detroit, U.S.A., has just reason to feel proud. At the recent Masonic fair held at that town he arranged to give a series of lantern exhibitions, or, as they are called in that country, stereopticon exhibitions. It appears that with such nicety did he give them that all the papers commenting upon the fair have been loud in their praises of his apparatus and ability. Those who know Mr. Bardwell must know that in lantern matters of an elaborate character the person to beat him at it has yet to be found. The sentence "Mr. Jex Bardwell at the lantern" is quite sufficient to ensure that everything will be of the highest possible class, and that things will run smoothly from beginning to end.

* * *

A "limelighter," Wm. Mordy by name, can boast of being the first person accused of assaulting anyone with a cylinder of compressed gas. It appears that he was walking along Waterloo Road with a cylinder on his shoulder, when by some means or other he collided with a lady who was approaching him. A fine of £5 was the result. The lady in question was struck between the eyes with the end of the cylinder.—Result: "Two (lovely) black eyes."

* * *

A short time ago Messrs. G. W. Wilson & Co., of Aberdeen, dispatched a representative to the southern part of Africa, and he obtained some good negatives of towns, incidents, and general life. Seeing that Africa is at present a subject of great interest, our readers will be glad to learn that an excellent set of lantern slides pertaining to the subject is published by this firm.

* * *

It may not be generally known that the "Church Army" have started a Lantern Department for the sale of lanterns, slides, etc., where many Church of England clergymen obtain their lanterns, slides, etc., for church services and missions. Also in connection with the above a photographic room where chemicals, plates, papers, etc., may be obtained at the usual prices. The Church Army, it may be remembered, has a lantern service in two London churches every Sunday evening, one in Upper Berkeley Street, W., and the other in St. Mary-at-Hill, Eastcheap. Mr. Mason, from the Stereoscopic Company, Regent Street, manipulating the lantern at St. Mary-at-Hill, and his assistant the one in the west. The use of the lantern for services and religious work is being largely advocated by the Church Army.

* * *

The *Westmoreland Gazette* says:—"Is the magic lantern played out as an instrument of torture at Band of Hope lectures? It appears so, if it is true that at Mealbank a temperance address by Mrs. Braithwaite was illustrated with a beer barrel (empty I presume), the cast-off clothing of a drunkard, also empty, and some other curious objects of vertu—and vice. This incident suggests a teetotal 'chamber of horror,' to which may presently be added, *à la* Madame Tussaud, a collection of wax-work figures, representing people in various stages of alcoholic suffering, from the farmer who is 'market merry,' to the abandoned wretch in the agonies of *delirium tremens*. I don't admire this mode of teaching the young idea what to shun. There is too much of 'the rop, the razzor, and the scaffold' about it, as the Scotch divine said."

* * *

Mr. W. C. Hughes, of Kingsland, specialist in the art of optical projection, has just sent one of his magnificent Docwra triple lanterns, with high-class objectives and accessories, to the young Prince of Mysore, son of the late Maharajah.

* * *

The lantern has now been used at the Guildhall on three occasions, the last being on the 17th ult., when 1,500 poor children were treated to a banquet and general entertainment. The latter included a lantern show, and the person selected to provide this part of the entertainment was Mr. H. G. Banks, whose entertainments in London, Channel Isles, and the provinces are now so well-known and appreciated that they are always a grand success. On this occasion he projected about 200 slides on a 37 feet screen, including Seasons, Ship on fire, Fire in Cheapside, Old water mill, Animated statuary, and a host of others. Needless to say, everyone enjoyed them.

* * *

We learn that the Leeds Camera Club (through their secretary) have written Messrs. Perken, Son & Rayment to say that their Optimus saturator was exhibited at their meeting of the 16th ult. by Mr. R. Bourke, and that it was compared with a blow-through and a mixed jet, and was found much superior to the former and quite equal to the latter.

People Photographed as Skeletons.

A Startling Discovery in Connection with Photography.

When the subject of psychic photography had been publically commented upon, certain wiseacres who admitted that they had had no experience whatever upon the subject, did not hesitate to give their decided opinion that it was fraud of some kind or other, and when certain people who had made a special study of the subject under the strictest of conditions gave their views as to obtaining certain images upon plates under test conditions, the aforesaid wiseacres solemnly shook their heads and said "Some trick." Upon this subject, however, we may at a future time have a good deal to say.

It might be interesting to hear what the same "wise men" who have had no experience, but who can offer a definite opinion, have to say as to the latest discovery in connection with photography.

It appears that a very important scientific re-discovery has been made by Professor Routgen, of Wurzberg University. Professor Routgen uses the light emitted from one of Crookes' vacuum tubes, through which an electric current is passed, which acts upon an ordinary photographic plate. The invisible light rays show that to them wood and various other substances are transparent.

In the course of an interview on this subject in our Editorial sanctum, a few days ago, with Mr. G. Lindsay Johnson, F.R.C.S., he stated that the essence of the whole thing depended upon the action of the waves of light at the ultra-violet end of the spectrum beyond the visual rays. These waves are of exceedingly short length, and move with great rapidity, and though invisible to the eye, are not so to a photographic plate. To get light waves short enough, it is necessary to have an electrical discharge of great potentiality, and to obtain this a current of at least 100 volts is passed through an induction coil, the secondary wires of which are connected with ten or more Leyden jars which are charged with the current; from these, wires lead to another induction coil, connected with a Crooke's radiant tube. This is a flask-shaped bulb (exhausted), into which two electrodes are passed, terminating in flat metal plates inside the flask, and it is between these two plates the discharge passes which illuminates the interior. The object of the induction coils and Leyden jars is to increase the potentiality of the current to the highest degree. The light inside the tube is visible to the eye, but these visible rays do not effect the photographic plate through a barrier of wood. The extreme ultra-violet rays invisible to the eye strongly affect photographic plates, and will penetrate wood, vulcanite, aluminium, and other substances opaque to the eye in proportion to the degree of potentiality of the electric current.

If a sensitive dry plate be placed in an ordinary double back or slide, with the sensitised surface directed towards the operator, and he places his hand in contact at the outside of the slide, and the Crooke's tube be placed a few inches behind the hand, the light waves will penetrate the flesh of the hand and every part of the slide, the bones only forming an obstruction to the light.

The bones do not form a complete but a partial obstruction, because they are more or less porous.

If the plate be developed in a dark room with pyro and alkali, the outlines of the hand will appear faintly, and the bones will appear well defined with the utmost nicety and precision. The semi-bony prominences into which the ligaments are inserted are as clearly seen as a dried preparation of the bone, and even the marrow cavities of the bones are produced with perfect definition.

The rationale, Mr. Johnson believes, of this peculiar action of light is as follows:—These light waves, of which all light is composed, and which vary in length according to the part of the spectrum formed, are so short at the extreme ultra-violet end, that they are able to penetrate between the molecules of all organic bodies which, as is known, are mainly composed of carbon, oxygen, hydrogen, and nitrogen, but are arrested by all metalloids and metals of greater density.

Bone is largely composed of phosphate of lime, and it is the lime or calcium of the bones which forms the opposition to these short light waves, but as these bones are not entirely solid or homogeneous, certain portions of the waves pass right through, so that the bones in a print from a negative do not appear as silhouettes on a white ground, but resemble a thin transparent object when viewed through the microscope, and illuminated by the mirror from below, and in consequence they have a roundness which greatly adds to their realistic appearance. In fact, portions of the bone seem in the print, so to speak, to be projected throughout their entire thickness.

In answer to the question how far this new photography could be useful in surgery and medicine, he replied: "There is no doubt that in those cases in which solid metal bodies in the body such as bullets and needles are suspected, and in those cases in which it is necessary to follow the directions of fractures and dislocations, it will be found of great use in surgery; but in these cases its application is, unfortunately, very limited, for only the hands, feet, and forearm can be thus photographed, since the other parts are too thick and impenetrable for this form of light to allow of any definition being seen."

It is said by the Germans that this form of light is not refrangible; in other words, it cannot be brought to a focus by a lens, and the reason appears to be that the molecules of the silicon of the glass do not allow the light to pass between them, and which is, therefore, entirely absorbed, so that to this light, glass is opaque, and it is possible that a lens of charcoal, aluminium, glucinium, or sulphur might focus rays of this light in the same way that glass refracts visible rays. Should Mr. Johnson's supposition prove correct, the refractive index of a large number of elements and compounds will be able to be determined, which would greatly increase our knowledge of the composition and atomic behaviour of bodies.

It is interesting to know that Messrs. Newton & Co., of Fleet Street, have just placed on the market a number of lantern slides showing photographs taken under the above conditions.

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The Late Mr. E. G. Wood.

Death has removed from our midst Mr. E. G. Wood, whose premises at 74, Cheapside are well known to users of lanterns and other scientific apparatus. On Saturday, the 11th ult., he passed quietly away, after a brief indisposition, at a ripe old age. Mr. Wood was born at Islington in 1811, and in his early days was engaged in wood carving, notably at the City churches and at Windsor Castle, but having a strong scientific tendency, he commenced the manufacture of scientific apparatus, in partnership with three of his brothers. After a time he accepted the managership of optical works which were opened at Newgate Street, which firm, on the retirement of the owner, blossomed into Messrs. Horne, Thornthwaite & Wood. Eventually, Mr. Wood made another change, viz., to commence business independently, and he opened the well-known premises at Cheapside.

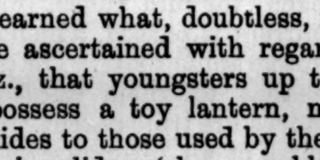
It is but a few months ago since Mr. Wood relinquished the entire management of the business to his son, Mr. A. A. Wood, who, needless to say, has been the right hand supporter for a number of years past, and to whose efforts and reputation are due the credit of successfully conducting one of the largest businesses in the optical line.

Whenever the late Mr. Wood came across a deserving case for help, he was the first to put his hand in his pocket to render assistance, for his ideas of charity always took a practical turn. Thus, by a judicious expenditure, and a little of what may be termed influence, he has been the means of ultimately raising many whose hopes had practically forsaken them, and many prosperous business men at the present day look back upon Mr. Wood as their friend, for it is "the friend in need who is the friend indeed."

——:o:——

Adapting Miniature Slides to a Full-Sized Lantern.

In course of a communication from Mr. Stocks, of Rye, we learned what, doubtless, many other fathers have ascertained with regard to their children, viz., that youngsters up to a certain age, who possess a toy lantern, much prefer their own slides to those used by their elders—in fact, their slides (cheap rubbish might, perhaps, be a fitting name) possess a charm which others do not. About this season paterfamilias often treats his children to a party, at which these slides must be shewn. It is quite evident that Mr. Stocks has lately had a hand in this sort of thing, and that one of his juveniles insisted upon him running the toy lantern. Mr. Stocks, with his vast lantern experience, officiating at a toy lantern would indeed seem strange; yet wishing to enter into the spirit of the thing, he consented to use his own lantern, but their slides, and in order to do so, he devised a carrier similar to that shown in the cut, and found it so successful that he mentioned the matter to us. We in turn, when we



get hold of a good idea, publish it for the benefit of our readers, and it is to be hoped that those who have at times to officiate as Mr. Stocks had, will likewise find this adaption a convenience, so that by means of a respectable lantern, and the children's own slides, they will be able to delight the hearts of the young.

—:o:—

American Politics and the Lantern.

DIFFERENT nations appreciate different classes of subjects for stage representation, and what may prove a great success in one, may meet with a very cold reception in another country. In America an entirely new class of play is being tried. The name of the play is, "Evolution—Woman and the Ballot." The first scene represented a room where the pantomime of voting was gone through; around the green-covered table sat prominent personages, some with their feet on the table, and the majority smoking cigars, doubtless feeling the great importance of their positions. After a numbers of votes of what may be termed peaceable citizens had been recorded, the scene brightened up by the arrival of a number of Indians, foreigners, coloured people, and a crowd of riff-raffs, in the most literal sense. Following in their wake a few quiet and demure ladies entered, and were in the act of recording their votes, when most of those present were at once up in arms and prevented them doing so. In the midst of terrible confusion the scene terminated.

The second set scene included an imposing Goddess of Liberty, to whom these identical women appealed, and so effective was their appeal that the statue descended from her pedestal, and offered her best support for the women's cause.

Scene three represented another voting room, arranged in much superior style to the first scene; no feet were on the tables, no cigars were being smoked, language was of a particulary refined character, everybody was especially well dressed, and very obliging. One would naturally wonder why all this change compared to the first scene, but this was soon answered when it was seen that at least one-half of the persons recording their votes were women.

The above gave rise to a new set of slides illustrating the scenes, the greater number of which are changed by means of flashing on. This set is now having a good round.

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Stereoscopic Projection on the Screen.

IN our last number we stated (page 15) that Mr. T. E. Freshwater, F.R.M.S., F.R.P.S., intended giving a public demonstration at the London and Provincial Photographic Association. A large audience was present to hear what he had to say, and to see what was to be seen, and all were highly interested. It being impossible to reproduce the effects here, we must be content with repeating what Mr. Freshwater had to say, viz. :—

"I think we can fairly claim that my system of getting a stereoscopic effect on the screen has not been shown to an audience before in this country. When we first saw the anaglyphs, the invention of Mr. Ducos du Hauron, we thought that something of the sort might be applied to the lantern, so set to work for that end. I tried a great many different ways, dyed my films in all sorts of colours, red, blue, yellow, used all the various coloured gelatines that I could get, had heaps of carbon tissue made in various ways to try and get the right colours, but with poor success. The great difficulty was to get the proper colour value in the different pigments that we used, and in the spectacles through which it is necessary to look at the picture. If these pictures could be produced in their proper colours in this way, they would have a much better effect than can be got with a black and white picture coloured by means of coloured glasses. Gelatines are of no use, you cannot get them of the proper colour value; and if you could they will not stand the heat of the lantern, for in a few seconds they blister up and burn, so I had to fall back to the coloured glass. Now, to show this system of stereoscopic projection, as I have said, it is necessary to have two lanterns, either a pair side by side or a bi-unial. In the one lantern you place one half of a stereoscopic picture, and in the other lantern the other half; now, behind one picture you place a red glass and behind the other picture a green glass. Now, when these two pictures are projected together on the screen, they are made to cover one another, so that we see an indistinct mass of colour caused by the two slides occupying the same place on the screen. If the coloured glasses are of the right colour value, and we cover up the green glass in the left eye, we shall see only one picture, and that all red, though there are still two pictures on the screen; now cover up the red glass in the right eye and look through the green glass of the left eye and we shall see only one picture, and that will be green, though the red one is still there; now look at the picture through both eyes of the coloured spectacles, with a red glass in the right eye and a green glass in the left eye, and we shall see that the two pictures that have been projected by the two lanterns on to the screen are made to blend, not only into one another, but to stand out in bold stereoscopic relief.

Let us consider for a moment the cause of this. We have two pictures of the same subject taken with a pair of lenses at two or more inches apart, so that one lens takes one picture at one angle, and the other lens at another angle; now, if we look at the picture so taken through an ordinary stereoscope with prisms, we get one impression, and so see the object photographed as we do in nature; just the same with the system that I shall presently show you. If you understand the principle on which this new stereoscopic projection is shown, you will more easily grasp the cause of the effect. As I have said before, we have two similar pictures of the same subject, one taken to the left and the other to the right, these two pictures being covered with coloured glasses, one red and the other green—we want to see each separately. In nature we see more to the left with the left eye, and more to the right with the right eye—we want to see these two pictures as one. To do this, we look at the left picture through a glass of the same colour as it is covered by, and the right picture by a coloured glass the same colour as it is covered by. So we get two pictures conveyed to the eyes separately at the same time, with the result as in nature, everything standing out in bold relief; so much so, that in the special stereoscopic pictures that I have prepared, the plants and other things stand out in such bold relief that one feels as if you could put your hand through the leaves and pick the flowers. To get the best effect the subject should be large, that is to say, when shown on the screen, as near life size as possible. I will show you some interiors—they are so real that you feel as if you must get up and walk down the long corridor, and sit on one of the seats; I will show you a party of travellers crossing a glacier, with their ladders and ropes — you will see how real it is. In looking at this picture on the flat, you get no idea of the difficult task these men have in hand. I have also two or three copies from an old set of diagrams, published many years ago, for showing objects in true perspective with stereoscopic effect, notably the one of a cross; if you look at it from one side of the room, you will see the front bar appear as if it stood right out and you could take hold of it with the hand; walk across to the other side of the room, and the bar will appear to follow you —now this is very curious. Another example: a figure of myself seated in a chair. If this is viewed at an angle, you seem as if you can see almost round the figure. The adaptation of this system has been brought within reach of any exhibitor by Messrs. Newton, of Fleet Street, and put upon the market at such a price that I hope we shall soon see it introduced into every public lecture and entertainment."

——:o:——

Stereoscopic Projection.

By A. I. Le Croft.

Those who are getting into the sere and yellow leaf, and those to whom the origin and history of the optical lantern and cognate subjects has something of a fascination, must have often marvelled, as I have done, how often the same idea has occurred to different minds, perhaps, almost simultaneously at distant parts of the earth, or perchance at wide differences of time, and yet there is no reason to doubt that the idea has been perfectly original in each case.

In a recent issue of a Transatlantic periodical, E. W. Scripture, of Yale University, describes a method of stereoscopic projection, which is shortly as follows:—

Spectacles of coloured glass with a particular red for the left eye, and a particular green for the right eye were arranged so that green light of a definite colour could not get into the left eye, and red light of a definite colour was excluded from the right eye, whereas, each can reach the eye having a glass of the same colour.

To project pictures in the red and green colours, two lanterns are used provided with red and green screens. Standard red and green railway glass is used for the latter; for limelight a very light red square, and a moderately dark green square, and for electric light a moderatetly dark green square and a light red one, the depth of colour being obtained by the varying thickness of the glasses.

The views are examined through similar coloured screens or spectacles, green glass for the right eye, and red glass for the left eye, the stereoscopic slides being projected by the two lanterns, that for the right eye being shown by the green screen lantern, and that for the left eye by the red screen lantern.

Adverting to the many obvious uses of stereoscopic projections from an educational point of view, Mr. Scripture mentions the subject of lectures on scientific apparatus, wherein details of construction or working may be shown. A flat view of such an instrument as a chronometer being more or less unintelligible, whilst by means of a stereoscopic view an apparently actual chronograph 10 to 20 feet long may be examined.

Mr. Scripture, referring to this method of stereoscopic projection, says that the method is, as far as he is concerned, original, and as far as he knows it is new, although, he adds, it is hard to believe that such an obvious method had not been thought of many times before.

This is one of those cases of innocent re-invention, to which I referred in the beginning of this article, but many will be surprised, I doubt not, to learn that this method was first advocated by Mon. De La Blanchère over forty years ago.

Blanchère's system consisted in projecting the two steroscopic pictures alternately in complimentary colours, each spectator being provided with spectacles, the right-hand glass of which was coloured to allow the right eye to see the right-hand picture, and the left-hand eye to see the left-hand picture. Later on two lanterns were used side by side, one provided with a red glass screen, and the other with a green glass screen, the pictures being viewed through spectacles provided with red and green glasses.

Further attempts in this direction were made by D'Almeida, Schobbens, of Antwerp, Moltein Ducos du Hauron, and others at different times, but with no great amount of success, although it would seem that with suitable coloured screens, and glasses, the method should be valuable since, in addition to its cheapness, there would be no restrictions as to the numbers who could witness the pictures, beyond the supply of eye-glasses, the cost of which would be small. A very strong light for projection purposes would no doubt be required, as the loss of light in transmission through the colour screens to the eyes would be considerable.

Anderton's method of stereoscopic projection brought out about three years ago is an elaboration of this method, but in place of using coloured screens and eye-glasses, polarising prisms are employed, by which means a considerably brighter and better toned picture is obtained.

:o:

Stereoscopic Effects on the Lantern Screen.

WHAT HAS BEEN DONE AND WHAT MAY BE DONE.—No. I.

By Thomas Bolas, F.C.S., F.I.C.

A brief period of keen interest in the stereoscope followed upon the exhibition of a stereoscope and slides at the great international show of 1851, by the French optician Duboscq. This rage for the stereoscope lasted only a little over ten years, and we must go back to this period for the most fundamental methods of stereoscopic projection, methods which reappear from time to time, but seem to take no real hold upon popular favour. Still, it may be hoped that lantern workers will realise that, assuming stereoscopic transparencies to be at hand, an expenditure of sixpence for coloured glasses in the lanterns, and at the rate of about one penny each for the observing glasses used by the spectators, will enable any dissolving view exhibitor to introduce occasional stereoscopic subjects; while an outlay of a few pounds for the polarising devices, &c., of Mr. Anderton will enable him, with no more trouble or loss of time, to show the best and most brightly illuminated stereoscopic effects hitherto obtainable on the screen. If something of this kind were done at lantern exhibitions generally, not only a new interest would be given to the show itself, but the present generation would perhaps—like the last—be led to realise the real value of the stereoscope as a means of representing conditions of reality which can be obtained by no other means.

The problem to be solved is to project both pictures of the stereogram upon a screen, so that each eye of the observer shall see but one picture, and it appears that the first suggestions as to a means of doing this were made by De la Blanchère as far back as 1853, but I have been unable to trace the publication of his method to the original source; still from the account given in Donnadieu's "Traité du Photographie Stereoscopique," it would appear that De la Blanchère realised in an imperfect way a method by which the stereoscopic effect on a screen may be seen by an observer unfurnished with any special observing device. The two images forming the stereogram were superimposed upon the same part of a ground glass screen, and in the course of one set of rays was interposed a blue glass, and in the course of the other set of rays a yellow glass. Assuming the images to be very small, and the axial ray of each projection system to be suitably inclined in a horizontal plane, it is easy to imagine a position on the other side of the ground glass screen, where one eye of the observer would receive chiefly yellow rays, and the other eye would chiefly receive blue rays, so that the image would be seen with some stereoscopic effect—an effect which would doubtless be much confused by the irregular reflection from the ground glass surface.

It must be remembered that at this period the now almost forgotten researches of Dove (1841) had made the scientific world aware that if one stereoscopic element of a solid figure is outlined in blue on a white ground, and the other stereoscopic element of the figure is outlined in red on the same sheet, a spectator furnished with a blue glass over one eye, and a red glass over the other eye, will see the stereoscopic union of the two coloured images. Dove's results in this direction are referred to and discussed by Tyndall in a paper which will be found in *Humphrey's Journal of Photography*, volume for 1852-53, issue of March 1, 1853. The above device of Dove is substantially a foreshadowing of the recent anaglyph of Ducos du Hauron, and it may be assumed that De la Blanchère's device was an effort to improve it by eliminating the discriminative coloured spectacles.

In 1858 J. Ch. D'Almeida, in a communication to the French Academy of Sciences, set forth very clearly the method of stereoscopic projection by distinctive colours and discriminating spectacles; but he does not appear to have known of the earlier work in the same direction. The original communication of D'Almeida will be found in the 47th volume of the *Comptes Rendus de l'Acadamie des Sciences*, at page 61, this volume being the second volume for 1858. A nearly full translation is to be found in the issue of the *Journal of the Photographic Society* for August 21st, 1858, page 2, and all the conditions of working are so clearly put that a short quotation may be given:—"For this purpose the author places in the course of the luminous rays two coloured glasses which have no element, or scarcely any element of the spectrum in common. One of these is the red glass, well known to physicists; the other the green glass, which he obtained in the shops. By means of these coloured glasses, one of the images thrown upon the screen is rendered green and the other red; and similar glasses being placed before the eyes, the green image alone will be perceived by the eye covered by the red glass, and the other to that furnished with the red glass. The relief then appears immediately. A very remarkable modification is observed on moving to one side; it appears then as if one saw all the changes which would be perceived if the objects were really in relief."

D'Almeida then describes another method—that of projecting the two images alternately by means of a revolving disc placed in the path of the light of the two projecting lanterns. As regards the observer, he says: "Whilst this wheel turns, the eyes look through another cardboard revolving on the same axis, and pierced with holes in the same way. The right eye can only see at the moment when the right perspective appears, and the left eye also becomes free when the left perspective makes its appearance; this may be effected by a small electro-magnetic apparatus."

(*To be continued.*)

—:o:—

Making a Dissolving Tap.

By Rev. Wm. H. Young, Ph.D.

Everyone appreciates the finest apparatus, but too often it must be through shop windows only. When compelled to do without such luxuries, we must be content with what we can make, and it is surprising what accurate and effective apparatus can be made out of homely materials. Indeed, the most celebrated artisans and scientists seem to prefer home-made implements, as was indelibly impressed upon the writer while he was privileged to assist the late Professor Joseph Henry in the Smithsonian Institution.

Those lanternists who have more skill than money, may easily make a perfect six-way dissolving tap for about five shillings.

First get two new double bracket cocks made for gas fixtures, Fig. I. (A). See that they are air-tight by blowing or sucking. These are then to be mounted in any desired way on a piece of wood, as in Fig. II.; one of them connecting with the oxygen bag or bottle, the other with the hydrogen or saturator.

It will be necessary to get two cocks, (B C) Fig. II., with which rubber tubes can be connected for the bottles, and by which the two gases can be shut-off at any desired time. Four nipples (D D D D) must be screwed into the other openings, by which rubber tubes can be connected with the jets of the bi-unial.

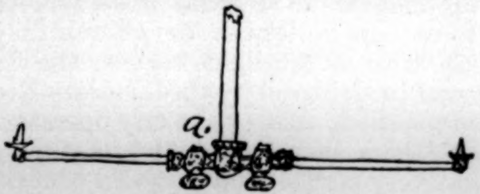

Fig. 1

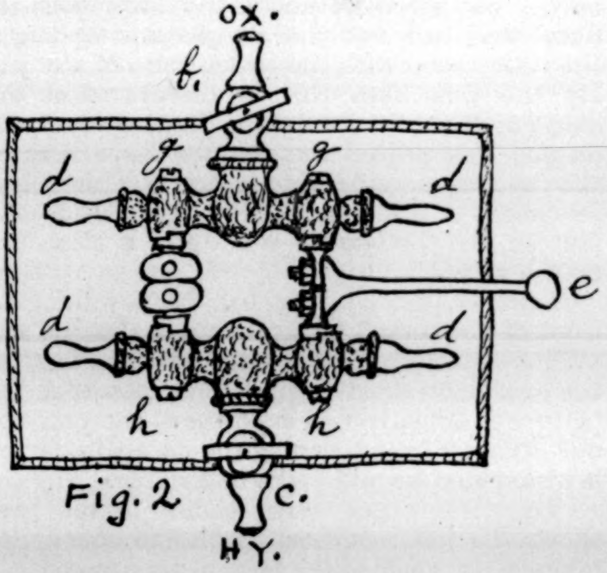

Fig. 2

Two levers, (E F) Fig. III., are to be connected with the two gas taps at either end, so as to turn both at one operation. To avoid jamming from any inaccuracy, it is well to allow a little play in the connections of these levers (E and F).

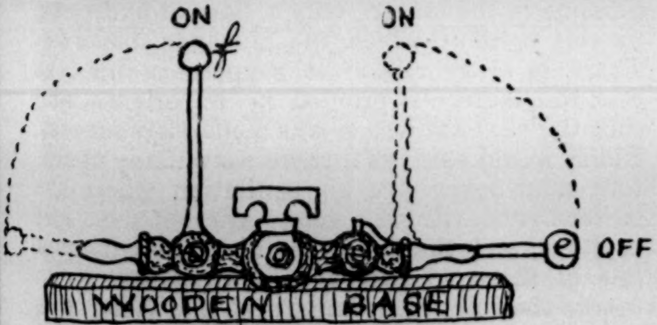

Fig. 3

In Fig. II. the lever (F) is removed to show the holes drilled in the tap handles, by which the said lever is connected therewith.

Having performed the above operations, it will be seen that the dissolver is complete; but if not corrected somewhat, it would put out the gas entirely at the jet when turned, besides working with a suddenness that would not be at all desirable.

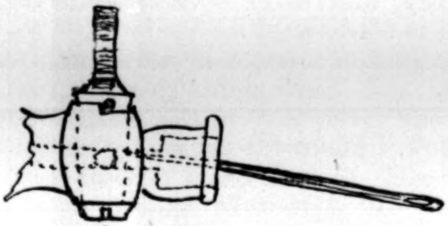

Fig. 4.

To avoid these two faults, the gas passage in the centre of each of the four plugs (G G H H) must be cautiously enlarged. This is the only portion of the work requiring any skill, but really does not demand anything but ordinary patience to do it perfectly.

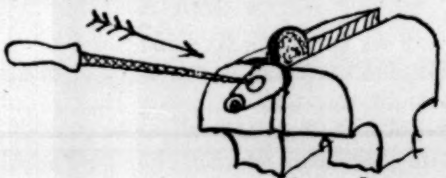

Fig. 5

Unscrew the four nipples (D), turn-off the taps (G H), and scratch on them with a long needle, as in Fig. IV., the exact position of the gas channel. Reverse their positions, and scribe the other side of these four plugs. Then unscrew the two oxygen plugs (G G), and fasten one at a time in a vice, as in Fig. V. By means of a very small rat-tail file enlarge the opening, as in Fig. VI., being careful of two things:— First, to push the file, as shown by the arrow in Fig. V., never drawing it back and forth as in ordinary filing, which would raise a burr on the plug and ruin it for its purpose; second, not to extend the tapering channel, (I) Fig. VI., as far as the little circle scratched by the needle, Fig. IV. File the openings on both sides of the plug exactly alike, wipe them clean, and replace.

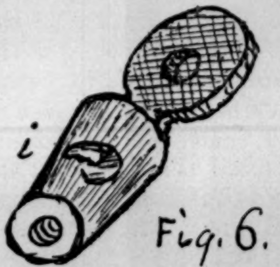

Fig. 6.

The two hydrogen plugs (H H) must be removed, clamped in the vice, and filed in the same way, but with this difference; the tapering channels, (I) Fig. VI., must be filed quite into the circles scratched by the needle. This acts as a bye-pass to permit enough hydrogen always to go to the jets to keep the light burning. To make a good job it will be essential that these hydrogen plugs be tried with gas and the lantern, and filed again very cautiously, until after several trials the exact amount is filed away.

In operation, this jet is as smooth-working, accurate and convenient as the most costly. When one lever, say (E) Fig. III., is down, its jet is dark. Moving it up slowly in the hollow of the palm of one hand, the oxygen rushes gradually through until that lantern is fully alight, when the hand can be slid from the end of (E) to the end of (F), and the lever (F) pressed down to extinguish the other jet.

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Hitches.

By Fred J. Scrimgeour.

Although at the present time most of the large and high-class lantern entertainments are given by professionals, the amateur has much to do in the smaller towns and villages in the way of illustrating lectures in churches and small halls. In many of these the lantern part of the lecture is anything but high-class. Sometimes the gas gives out, or the slides get mixed in the dark, or other minor calamities cause those hitches which mark the second-class exhibition.

Perhaps the most common cause of breakdown in the villages is when the lanterist thinks he understands the limelight, and only finds he does not when the audience has assembled. In many a village the church owns an oil lantern, which has often done its duty of showing the rat-eating-man and kindred slides nobly and well. It is the magic lantern of the village, and has amused both old and young at the annual Sunday school soirée for many years. The Young Men's Literary Society have (let us suppose) been fortunate in getting the promise of a lecture on Palestine from a minister in the nearest large city, and he is to bring a limelight lantern and operator with him. The lecture is a great success. The country minister is delighted with the lecture, and proposes a vote of thanks to the city minister. The young men, including the local amateur photographer, are delighted with the brightness of the limelight, and the latter proposes a vote of thanks to the city operator, and then in a body they offer their services in helping to pack his apparatus.

The lanternist that night enjoys the hospitality of the photographer, and talks lanterns and limelight with his host until past midnight.

The result of it all is that the A. P. calls upon the minister to say that if he will permit them to use the lantern of the church they will fit it up with a limelight burner, the cost of which will be defrayed by the Literary Society. He also mentions that as the city operator they had with them last week told him that limelight was very simple, and also told him exactly how to manage it, he would undertake the responsibility of operator himself. Permission is given, and a nice blow-through jet is bought from the shop with which the city operator is connected.

The first exhibition is not a success. The burner was all right and would have done its duty well had not the oxygen and hydrogen been connected with the wrong sides of the jet. By the time that this is discovered as the cause of the want of light, a large quantity of oxygen has passed through the large bore of the hydrogen tube into space. This defect remedied, a brilliant light is got inside the lantern, but somehow it won't give a clear disc on the screen.

However, the minister has been waiting in front of the screen for ten minutes already, and even a country audience can get impatient, so the exhibition must begin. The fact that the picture is actually visible on the sheet prevents our operator from touching the jet again, for he is afraid that he will make bad worse.

By the time ten slides have been shown he has recovered sufficient courage to manage, by pushing the lantern tray in and out, and by moving the jet up and down, to discover a position when the disc is fairly clear, and the lecture promises to finish with *eclat*. As it is, so much oxygen has been wasted at the beginning that the light in a few minutes after becomes suddenly dim, and, finally, there remains in the lantern only a flare of hydrogen, by the light of which the audience disperses. There is every reason to suppose in this case that this lanternist profited by experience, and that the next exhibition was a complete success. But it would seem as if there were many operators who never give an exhibition where the lantern runs without a single hitch of some sort or other, and the following hints may help a few of those to gain that smoothness which marks the competent lanternist, and which to a great degree marks the first-class show :—

If not acquainted with the hall in which you are to exhibit, be there with all your apparatus at least an hour before the public are admitted, which should not be more than half-an-hour before the entertainment commences. Place the screen, if possible, high, and remember that the higher it is placed the greater tilt it requires, in order to be parallel with the slide in the lantern. Place the lantern at the proper distance from the screen by measurement, as the distance should never require to be altered after the lantern is once set up and the gases connected. Tie well all gas connections, especially all hydrogen connections, if you are using that gas compressed. If you are taking coal gas from the hall, see that the tubing from the gas bracket to the lantern is placed so as to be free from the feet of the audience. It is very often best to bring it above their heads by placing a long rod upright near the lantern, and suspending the rubber tube between the top of it and the gas bracket. Focus a slide with a square mask on the screen, and then cap the lens and turn off the gases. Place the first slide in position, and then convince the hall-keeper that all the gas jets in the hall must not be turned town all together at the meter. This sometimes takes both time and patience. Light up, without shifting the position of the jet, about two minutes before the first picture is required, keeping the lens still closed.

Wait until the lights of the hall are down as far as possible before you uncap the lens, for if the audience have been in the dark for a few seconds before the screen is illuminated, the picture will seem much brighter than if you had thrown the picture on the sheet before the gas had been lowered.

Then, if you keep cool, your part of the lecture will go all right, and the audience will have gained confidence in you as an efficient lantern operator.

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Slides Without Mat Covers or Binding.

By Rev. W. M. H. Young, Ph.D.

Of course, no one objects to elegantly mounted slides; but there are hundreds of clerical and other lanternists, like myself, who cannot afford all they would like. Those of us who exhibit weekly to the same people year by year, have to prepare numberless new slides, many of which are to be used but once only. To mount them in regulation style, with cover glass, mat, binding-strips and printed titles, would be a waste of time and money under the circumstances. And yet we do not wish our views to present a slovenly appearance on the screen.

I prepare my negatives so that the result upon the screen is the same as the best mounted slide. The process consists in cutting off the film of the negative with a very keen chisel, leaving that portion of the picture that would usually be shown through a mat.

Draw upon the film of the negative with a pencil the exact size and shape you wish the "mat opening" to be. Of course, some sort of a guide must be used for the corner of the chisel, and keep at it until the film is cut entirely away outside that part of the view to be copied upon the transparency. The clear glass thus exposed will make a dense border around the picture upon the transparency, which will take the place of any mat. This method works equally well for contact or camera transparencies.

If irregular designs are desired instead of the ordinary rectangular mat openings, it is easy to make them—and highly artistic too—by holding the chisel at an angle while cutting the outline. In this way the film is pared off bevelled, giving a peculiar gradation of tone to a scalloped design.

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Oil Lights.

By W. J. Coles, A.M.I.C.E.

Noticing in the correspondence column of last issue a letter on the above subject, I thought, perhaps, a few remarks upon the same might interest many lanternists.

It is, of course, quite possible to construct an oil lamp to give 300, or even much more candle-power, by multiplying the number of wicks, and making them wider; but the question is, would it be of use in the lantern, and would there be a corresponding gain on the screen?

In answering this, it must not be forgotten that when the lamp is intended for use with the lantern, the flame should be as small as possible —in fact, in order to get a perfect focus, and thereby a perfect definition (at least, so far as the lenses will permit), the source of illumination should be a point, which according to the definition in Euclid "is without parts, or which has no magnitude."

With lamps having four wicks, as at present made, with the flames as close together as they will burn, the light is much larger in size than it should be for good definition, for only an approximate focus can be obtained—in fact, a better result would be obtained from a 3-wick lamp, even though the total light was somewhat less than that of the 4-wicks.

From the above it will be seen that to increase the number or size of the flames is to destroy the definition. Besides, by so doing, a much less proportion of the light would be utilised, as either it would not fall upon the condenser, or if caught by the condenser would not be thrown to the focus of the front lenses, and so would either be wasted, or help to spoil the definition. Also it must be remembered that with the present lamp there is quite enough heat in the lantern without adding to it, which would be the result of increasing the number or size of wicks.

It will be clear by the foregoing that we must not look to increase the power of the light by increasing the number and size of the wicks, but rather to better utilise, if possible, the light already obtained.

With the "Stock's" lamp, which was quoted as "the most powerful tested oil lamp," I thought that as much useful light as it was possible to obtain was obtained; but I have recently been experimenting upon an improved form of the same lamp, which has only 3 wicks, and which give as much light as the 4 wicks in the present form, and by means of a specially designed reflector, a light equal in intensity to about 150 candle-power is available for the condenser. The definition is also improved in accordance with the reason given above.

Perhaps it ought to be mentioned that this lamp is at present only in its experimental stage, and possibly the final form will give even better results.

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Collodio-Bromide for Transparencies.*

BY F. DUNSTERVILLE.

I HAVE been induced to come forward on this occasion and show the process of making and using collodion emulsion, as it appears to me that the process has almost entirely escaped the notice of amateurs in this country; and as the process is one peculiarly adapted for use in hot climates, I trust that the short description I am about to give of it will induce some more competent members of our Society to take it up and show us what can be done with it.

The formula, on which the process as shown by me is based, was originally given to me by one of the leading amateurs in London, and the developing and other formulæ are the result of my enquiries and experiments. The plates made by this formula would be considered as very slow indeed by any one who only has experience of the modern rapid gelatine-plate, but although they are so slow, the exposure for contact transparencies is only 2 to 5 seconds with a clean, bright negative and diffused daylight:—

PLAIN COLLODION.

Alcohol, methylated	4½ drams.
Ether	3½ ,,
Gun-cotton—high temperature ..	12 grains.

BROMIDE SOLUTION.

Alcohol, methylated	1½ drams.
Distilled water	20 minims.
Ammonium bromide.	13 grains.

SILVER SOLUTION.

Distilled water	12 minims.
Silver Nitrate	20 grains.

It is generally considered that the most important point in the whole process is to obtain a suitable quality of pyroxiline, and when this has been got, the rest is comparatively easy; it is advisable, on getting suitable pyroxiline, to make a stock of plain collodion and let it rest for some time, so that all insoluble particles and other impurities may sink to the bottom; tall narrow bottles are best to store it in. The proportion for a stock may be:—Alcohol, 22 ounces; ether, 18 ounces; pyroxiline, 1 ounce.

The bromide should be dissolved in the given quantity of water made almost boiling, and the alcohol should not be added until the solution has got quite cool again.

The silver may be readily dissolved if the water be warmed.

To make the emulsion, pour the 1 ounce plain collodion into a clean 4-ounce bottle with glass stopper, then add the bromide solution, shaking well for some minutes; the bottle containing the bromized collodion should then be taken into the dark room and the silver solution added little by little, shaking well between each addition; it is well to rinse out both the bromide and silver bottles with a little of the collodion to ensure the whole of the salts being taken up.

The emulsion should then be kept in the dark for about 24 hours, shaking well at frequent intervals, and when ready for washing it should be poured into a glass dish which should be large enough to contain the quantity of emulsion in a mass not thicker than ⅛ inch; as the solvents evaporate, a skin forms on the surface which should be broken up occasionally with a silver spoon, or an ivory paper knife. When the solvents are completely evaporated, the pellicle should be washed in frequent changes of distilled water for half-an-hour or so until all the soluble salts have been removed. The pellicle should then be squeezed in pieces of clean calico until as much as possible of the water is removed, and it can then be dried by moderate heat over a water-bath. The whole of the washing process must be done in the dark-room or at night time by the light of a candle placed at some distance.

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*A communication to the Amateur Photographic Society of Madras.

When quite dry the pelicle may be re-dissolved in $\frac{3}{4}$ ounce alcohol absolute, ·805, and $\frac{3}{4}$ ounce ether sulphuric pure, ·720 (pouring the ether on first); and when all the pellicle is dissolved, the bottle (a 4-ounce one) should be well shaken up, and in about 20 minutes to half-an-hour the emulsion will be ready to coat plates with, after being carefully filtered.

The plates ($3\frac{1}{4}$ inches square for choice) should be very carefully cleaned in the following way:—First soak them in dilute nitric acid (acid 1 part, water 10 parts), then rinse them in plenty of clean water, drying them with a clean cloth. They should then be polished on both sides with a cleaning solution (say Tripoli powder mixed with methylated spirit and a little ammonia), after which they may either be edged with India rubber solution to the extent of $\frac{1}{8}$ inch all round, or they may be dipped in a hot solution of gelatine (20 grains to 20 ounces of water) and dried with a clean cloth.

The filter for the emulsion may be merely a small funnel with a little tuft of cotton jammed in it, through which a little alcohol should first be run, or what is better, the first portion of emulsion running through may be returned to the filter.

Before coating a large number of plates, it is advisable to try whether the emulsion is in good working order and free from fog; to do this, coat a plate with the emulsion, and, as soon as it is well set, wash it in clean water until all the alcohol and ether are washed out, then pour over it a little developer of full strength, and after letting it remain on the plate for a few minutes wash well and fix it; this of course should all be done in the dark room, and the plate should fix out perfectly clear and free from fog or stains. If stains are present, the cause is generally dirty plates (that is, they are not chemically clean), but if fog is present, a drop or two of an alcoholic solution of iodine will effect a speedy cure. If the later addition be necessary, the emulson must be well shaken up again and allowed to rest for half-an-hour before re-filtering and coating plates.

To any one who has worked the wet process, it will be easy to coat plates with emulsion, but as very many of those belonging to the Society are probably only acquainted with the modern gelatine plate, a short description may be useful.

After securely fixing a pneumatic holder to the back of the plate, dust the top surface with a flat camel-hair brush and pour on the centre of the plate a pool of emulsion that will cover about one-fourth of the whole area: let the emulsion run to the right-hand far corner, then to the left far corner, then to the left near corner, and finally pour off the surplus by the right near corner into the filter; the plate should then be raised to an almost vertical position and rocked vigorously to and fro to prevent markings; when the emulsion is apparently set and no more drops from the plate, it may be put into a grooved rack to dry spontaneously or laid upon a flat surface and dried by gentle heat, 150°.

A few dozens of plates may be coated in a very short time, and they will keep very well for a considerable time.

Transparencies may now be made on these coated plates either by contact or in the camera; by contact, using a clean bright negative (like the one now shown) with diffused daylight, the exposure need only be from 1 to 4 seconds; in the camera the exposure of course depends upon the amount of reduction and the stop used in the lens, so that it is almost impossible to give any safe guide, but I may say that using a Ross' Rapid Symmetrical Lens, full aperture, a clean bright negative $6\frac{1}{2} \times 4\frac{3}{4}$ inches to be reduced to $3\frac{1}{4}$ inches square, and using a clear sky as a background, the exposure may be anything from 2 to 6 minutes. When making slides by reduction in the camera, the plates may be exposed as soon as coated and the emulsion set; there is no need to wait until they become dry, as they are put in a dark slide, and the surface therefore does not get injured in any way.

The longer the exposure the warmer in colour will be the resulting picture. Short exposures and full strength developer give black cold tones, but full exposures with diluted or restrained developer give almost any colour from brown to ruby, and these warm colours can be subsequently modified to any extent in toning.

Too much care cannot be exercised in handling these plates, the surface being very much more delicate than that of the ordinary gelatine plate. The negative must be very carefully dusted with a flat brush, and then the plate must be laid directly on the negative in the printing frame, taking care that while fastenting the springs, no sliding or rubbing action takes place. The printing frame shown herewith has some new fastenings which obviate the risk of rubbing when putting the springs into action. The springs also should not be so strong as in the ordinary printing frame.

The developing solutions may be made up as follows:—

Stock Solutions.

1.	Pyrogallic acid ..	96 grains.	
	Alcohol, Methylated..	1 ounce.	
2.	Carbonate of ammonia	160 grains.	
	Potassium bromide ..	5 ,,	
	Acetate of soda ..	10 ,,	
	Distilled water ..	3 ounces.	
	or		
1*a*.	Pyrogallic acid ..	1 ounce.	Faintly acid with citric acid.
	Sulphite of soda ..	4 ounces	
	Distilled water ..	9 ,,	
2*a*.	Liqour ammonia ..	1 ounce.	
	Bromide potassium ..	2 ounces.	
	Water, distilled ..	9 ,,	

To develop, first soak the exposed plate in dilute methylated alcohol (2 spirit to 1 water), and then wash off the spirit with plenty of clean water; the working developer may be made up thus, either:—

1.	15. minims	or	.. 1*a*.	40 minims.
2.	2. drams	,,	.. 2*a*.	10 ,,
Water	2. ,,	,,	..Water	3 drams.

A very little developer is sufficient if the plate be held in the hand, one dram easily developing a plate 3¼ inches square; if fully exposed, the developer may be diluted with another dram or two of water; the image soon makes its appearance and rapidly develops up to full density. When there is any sign of veil coming over the high lights, wash off the developer and fix in potassium cyanide, 15 grains to the ounce of water, and well wash for half-an-hour.

It may be as well to mention that potassium cyanide is a most deadly poison (3 grains being a fatal dose), and that it is not necessary to keep the dish with this solution in the dark room: if the plate be well washed after developing, it may safely be taken outside the dark room and dropped into the fixing solution, which may be on a table out in the open air: bad headaches will thereby be avoided.

After fixing and well washing the plate may be examined, and should any veil appear on the high lights, clear it off by soaking the plate for 3 or 4 seconds in a solution made by taking a few drops of an alcoholic tincture of iodine and adding to them distilled water till the solution is the colour of pale sherry; again wash and return to the fixing dish. If still not quite clear, do it again, and again if necessary—then wash well.

To tone the transparency, take

Platinum tetra-chloride	1 grain.
Nitric acid	1 minim.
Water	4 ounces.

and immerse the plate, watch carefully, as the toning proceeds very rapidly; as soon as the wished for colour is produced take the plate out at once and wash well and quickly.

Should the toning have gone too far the warm colour may be restored by flowing again over the plate, the alkaline developing solution and the toning done over again more carefully.

Should the picture appear too thin after toning, it may easily be intensified to any degree by the following solution:—

Pyrogallic acid ..	30 grains	To each dram of this add 2 or 3 drops of a 20-grain solution of silver nitrate.
Citric acid	30 ,,	
Allum	30 ,,	
Distilled water ..	15 ozs.	

Should the picture appear too dense after toning, it may be reduced by flowing again over it the fixing solution.

After any of these operations the plate should be well washed, and when quite finished and dried in a place free from dust, it should be varnished with a clear pale varnish, which should be carefully filtered through tissue paper or cotton wool.

The final operation for a lantern slide is mounting it in contact with another clean glass of the same size, putting a suitable mask between them, and binding the edges with strips of black paper.

Mounting a lantern slide requires some consideration, and each slide should be mounted in a mask that is specially suited to show off the artistic beauties of the picture; it used to be the custom to mount all lantern slides with a circular or cushion-shaped opening, but this was only done on account of the practice of using two lanterns for dissolving, so that it was then necessary to have all the pictures with openings of the same shape and size in order to get the views to register correctly on the screen.

Now, however, that single lanterns with slide-holders capable of very rapid changes are more in vogue, there is no need for such conservatism, and I would advise every one to make and mount his slides with masks of the size and shape best adapted to each particular view.

It is also usual to put on the front of the slide one or two white spots of paper at the top, and then on putting the slides into the holder of the lantern these white spots will be at the bottom next to the condenser.

The name of the picture may be written on the mask (before mounting) in Chinese white, or a slip of white paper may be gummed on the front outside, and the name written in black ink.

Whatever plan any one may adopt for marking his slides it is advisable for each to stick to one and the same plan for all of his own slides, and then less trouble is likely to occur if a stranger is showing them in the lantern.

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Topical Notes.

By The Dreamer.

A GREAT deal of nonsense was talked at a recent case before one of the London magistrates, in which a young man, a woman, and a gas bottle were principally concerned. Of course, the nonsense came in in connection with the gas bottle, it being spoken of as if it were in the same category as a packet of dynamite, a torpedo, or the gun, the user of which "did not know it was loaded."

It is a thousand pities that the report of the Select Committee, appointed to enquire into the gas bottle business, has not been issued yet, so that those who know nothing about gas cylinders—like some of those engaged in the above case—may have their minds set at rest concerning the supposed death-dealing devastation—that's a good phrase—lurking in the innocent looking tube.

I DREAMT—this is another way of saying "Rumour says," or "A little bird has told me" —that a new jet, which will beat anything produced in London or elsewhere, not excluding Scarborough, or Freshwater—Isle of Wight, of course, not Newto(w)n—will at a not far distant date be put on the market. Let it come along; the more the merrier.

The changes in the photographic periodical world are bewildering in their diversity; in fact, of the leading papers, *Photography* is the only one that changeth not. Perhaps friend Sturmey thinks it is best to let well alone.

The recent discoveries of the German savant Roütgen, whilst relating, strictly speaking, to photography, may have some connection with the optical lantern. To medical science, the value of his discovery will be incalculable, as by its means, bullets, broken bones, enlarged joints, stray needles, etc., can be quickly located. No doubt, in time, some very peculiar lantern slides will be produced from negatives taken with Crooke's vacuum tubes.

Thus, slides such as the following interspersed amongst the ordinary lantern night pictures would prove a welcome innovation:—(1) Interior of ostrich after its dinner in a blacksmith's shop. (2) Honest Bill, the diamond digger (interior view). (3) The dogs' home (taken through the door of a sausage factory), etc., etc.

I HAVE just heard that one of our oldest lantern workers and experimentalists has passed away in the person of Mr. E. G. Wood, of 74, Cheapside, London, E.C. He died on the 11th January, at the advanced age of 85.

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Vertical Attachments.

By E. Drew.

When the lantern began to be used for educational purposes it soon became evident that a means was required to project upon the screen objects placed in a horizontal position. How old the idea, or who was the first to devise a vertical attachment, is not known. Duboscq, whose name may be well-known to those associated with the lantern, used one about 1868. Since that time the application of the vertical attachment to the science lantern has brought about a large amount of ingenuity in the arranging of the optical parts.

At first, the vertical attachment formed an apparatus entirely separated from the lantern, and in some cases a lantern was especially constructed for this class of work, but latterly means have been adopted for arranging the lantern so that a change can be readily effected to allow it to suit itself for the class of work it is intended to perform, and not to interfere with the position of the parts that it was previously arranged for.

One of the most simple methods of making a vertical attachment is from a piece of apparatus —the common retort stand—which always forms part of the apparatus used in teaching chemistry. Fig. I. is a simple sketch, showing the position of the various parts.

The retort stand of the usual iron base and upright has movably arranged upon the iron rod, first a swivelled clamp, which holds a mirror in an inclined mirror by means of a lug of wood (B) secured to it. Above the mirror is arranged a large ring (C), into which a spherically-shaped dish (D) is placed, and filled with fluid. Immediately above this and in a smaller ring (E) is fixed the objective (F). The ring should be sufficiently large so that when the hood of the objective is unscrewed the brass mounting of the lens just passes through, and when the hood is again screwed on the objective is held securely in position; finally, a second and smaller mirror (G) is held in a clamp (H) above the objective.

The rays of light falling upon the lower mirror are reflected up through the liquid condenser (D) through the objective (I), and again reflected by the smaller mirror (G) upon the screen.

Experiments in cohesion can be carried on the surface of the liquid condensers, and many other experiments may be illustrated by placing a piece of plate-glass upon the glass dish (D), arranging upon it whatever is to be shown.

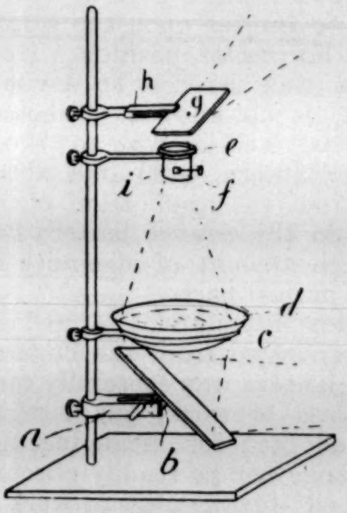

Fig. I.

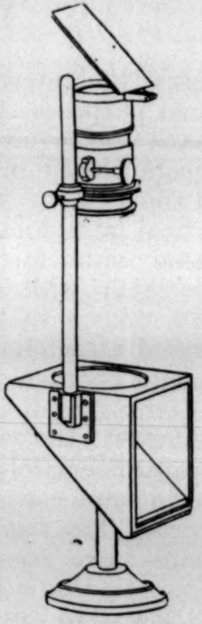

Fig. II.

Although this piece of apparatus answers very well for a makeshift, and even on some occasions is more useful than a more expensive arrangement, still for some class of work a more elaborate arrangement is essential. Fig. II. shows this more intricate piece of apparatus, and it is similar to that used by Professor Tyndall when showing some of his numerous experiments. It consists of optical parts similar to that shown in Fig. I., with the exception that the water lens (A) is replaced by a glass plano convex lens. The whole is mounted on a firm brass stand, sometimes having levelling screws for obtaining the proper adjustment of the beam of light from the lantern. This method has its advantages, but much time is lost in getting the proper adjustment of the light. The difficulty is now largely overcome by arranging the optical parts, as shown in Fig. III., except where revolving circular or hexagonal bodied lanterns with radiating parts taking the various optical arrangements are used, which form the more expensive projection lanterns for use in large institutions.

The arrangement of optical parts shown in the sketch Fig. III. referred to, lends itself to the construction of an inexpensive form of instrument to obtain the desired end. It will be seen that the same double plano convex condensers used for the ordinary projection are mounted so that they can be readily adjusted with their plane surfaces at right angles to one another. The third side is taken up by a mirror which reflects the almost parallel rays from the condenser (A) to the condenser (B), when, after passing through the object to be exhibited, the rays are brought to a focus for transmission by the objective (C), thence again at right angles by the small mirror or right angled prism (D).

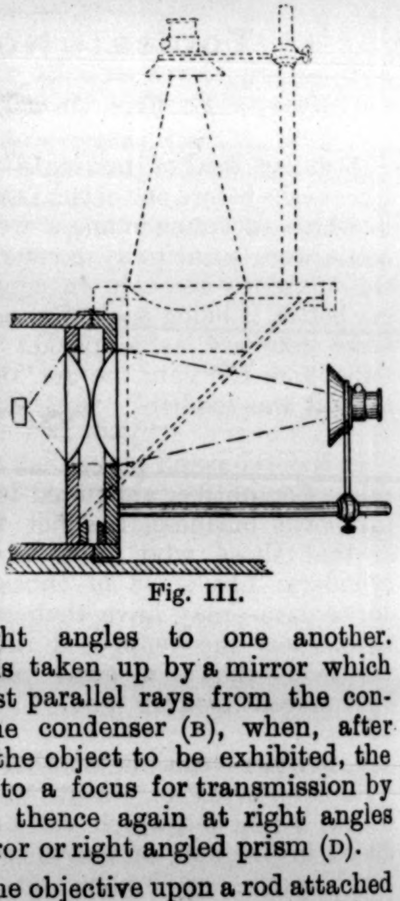

Fig. III.

By mounting the objective upon a rod attached to the moveable lantern front the same objective can be utilised when the lantern is being used for vertical or horizontal projection, thus reducing the cost, and at the same time allowing the change from one position to another to be rapidly accomplished.

Another arrangement, which forms the subject of a patent taken out jointly by W. Stroud and J. R. Rendell, enables us to obtain the desired end in a novel way. Three condensing lenses are employed, as shown in Fig. IV.; L is the lime or other source of light. The lens (K) and either M or D, according as a direct or reflected beam of light is required from the condensing apparatus, is so arranged that the beam emerging from K is slightly diverged, as shown by the straight dotted lines; N is a mirror attached to a hinge. A stud fixed to the mirror passes through a curved slot in the side of the box, and allows the mirrors to be moved through the required distance to bring it to a suitable angle to direct the beam of light through the lens (D). The sketch shows the mirror in a position to effect this. By raising the mirror, by means of the projecting stud, and retaining it in position by the stud, ordinary projection can be carried on.

By this method a change is more easily effected than in any of the former methods, and it is not necessary to remove any apparatus that can be already in position for showing in front of the condenser (M). The arrangement of the parts gives wide scope for making the apparatus in a compact and handy form, at the same time rigid and not liable to tremurs. There seems to be a slight loss of light when using this arrangement of parts for ordinary projection, but not sufficient to prevent it from becoming a popular instrument for science lectures.

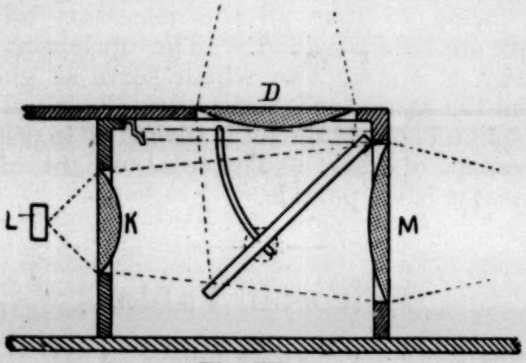

Fig. IV.

There are other methods by which vertical projection can be obtained. One is by bodily tilting the lantern until the objective points in a vertical direction. The lantern must be well ventilated to allow of this being done, and care should be taken that the flare is prevented, as it is very apt to crack the condenser. Mr. Lewis Wright, in his book on "Optical Projection," speaks well of this method. In order to carry out this method of vertical projection, Messrs. Newton & Co. have constructed a bi-unial scientist's lantern with the top lantern to turn on a hinge into the vertical position, resting against stops to retain it there.

The last method is similar to that shown in Fig. IV., except that only two condensing lenses are employed. There being no small condenser (K) the parallel rays of light from a parabolic reflector directed to the lenses in the position of M and D by a mirror, according as to whether the lantern is required for horizontal or vertical projection. This method seems liable to the same danger as the former method, inasmuch as the condenser on the top of the lantern is liable to get excessively hot, and thus interfere with some of the experiments being carried out.

These methods of arranging the optical parts are some that have been devised for the convenience of vertical projection. Bearing in mind the essential features of a lantern, and the varied work it is required to perform, the reader must judge for himself which is likely to be generally used.

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Registering Discs; How to Make and Use Them.

By A Lanternist.

What does, in the first instance, registering mean? It means that one and every slide dissolved should appear perfectly coincident to the preceding one both in shape and in size. Take some effects for—instance they are—we will suppose, day and night effects of the Houses of Parliament, beautifully painted, but when the two are being used, and one dissolved into the other, the whole effect is lost by not being in register; the clock-tower, roof, windows, must superimpose over each other, so that they should appear as one slide, also the edges of the picture should be exactly coincident; the mats in the slides should be alike—not one a circle and the other a cushion square—for this effect is simply horrible.

How are we to arrive at a method whereby the above can be avoided? First, we must have some system, and without that registration is practically an impossibility. Of course I am alluding to a bi-unial or a triple lantern. With the ordinary single lantern there should be no difficulty to make one slide take the place of the one just shown. There have been many various and somewhat expensive apparatus brought out to get the desired effect, but they are as a rule too expensive for the average operator's pocket. Now, my intention is to tell my readers of a very simple idea that can be made with very little trouble or expense—say a shilling. After describing the method of making them, I will give you my ideas as to using them, as I have used them with success during the last five years, and have found them answer admirably on most occasions, and perhaps others have also. Where the ordinary slide is used in a carrier made of mahogany 7 in. by 4½ in., that has a slide within 7 in. by 3⅞ in., in the centre of which there is an opening a trifle over 3 in. square, so that the slide can be put in at the top when withdrawn, and simply pushed home. I have found, not without some experience, that for a bi-unial or a triple they are certainly the best and cheapest in the long run, for there is a feeling when using them of an absolute impossibility of jamming. I have found the more simple the carrier the more efficient it is in use.

Now, as to make the discs: take two unexposed transparency lantern plates 3¼ in. square, and without any light getting at them, fix them in hypo in the ordinary way, and give a good wash afterwards; whilst washing obtain a tray or developing dish large enough to take the two plates at once, and into same put a sufficient water to cover them, and then add whatever aniline colour you prefer, so that when the plates is placed in same they may be soaked, and both have a similar tone of colour; this need not be carried too deep—then take them out and just rinse in water, and set up to dry face or the stained side downwards; when dry handle carefully and place on a piece of white blotting paper on a drawing board face upwards, after which divide your 3¼ in. square into 4 equal squares by drawing the point of a penknife horizontally and vertically across the centre, and 1⅝ in. from each corner; this must be done very carefully, and best with a small flat rule.

(*To be continued.*)

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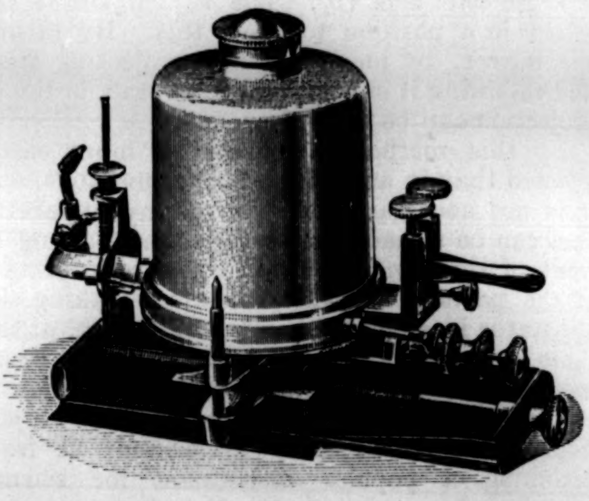
New Apparatus.

CLIMAX SATURATOR.

Mr. Houldershaw, of Liversedge, has sent us one of his saturators bearing this name. As shown in the cut, it is complete with raising tray. The whole apparatus strikes one as being somewhat massive, and certainly there are certain parts which contain more metal than necessary. The charge of ether (about 5 ounces) is poured in at the top after undoing the large cap on top; tubing from the oxygen supply is attached to the projecting tube at right-hand side of the cut, and the flow of etherised oxygen is controlled by the left-hand screw-down valve, which is immediately above, whilst that to the right controls the supply of pure oxygen. Immediately below this tube connector are two milled heads, that on the left adjusting the difference between the jet and the lime; the milled head to the right turns and raises the lime. The other milled heads are in connection with the adjustments of the tray, the lowest moves the saturator backwards or forwards, whilst above this are two working independently, the outer one raising or lowering the saturator, and the inner one imparting a side swing, so that all the necessary adjustments are here provided. The upright at side of tray is one of two which serve as guides. When the saturator is not in use the small tap immediately below the jet is turned off to prevent the escape of ether. The total weight of the apparatus is six pounds.



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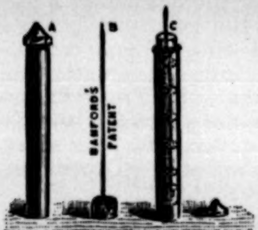
Editorial Table.

"BEN HUR": A TALE OF CHRIST.—A set of sixty-five slides, illustrative of the above, has been issued by Messrs. Riley Bros., of Bradford. The pictures are of a unique character, and are the work of an artist in every sense of the word. The figures have evidently been photographed against a plain white background, and on a print from this has been artistically sketched the surrounding scenery. This has been done in such a high-class manner that one would be inclined to think they were photographed from Nature. Although many of the subjects are from life models, those that are not are practically just as good. In the catalogue of this set, Messrs. Riley have made a most welcome addition to catalogues in general, for they have reproduced the whole of the slides in miniature (half tones), so that one sees exactly the kind of subjects before placing the order. This illustrated catalogue is issued at one penny.

BUNYAN'S "PILGRIM'S PROGRESS," by the same firm, is issued in catalogue form in the same style. The sixty illustrations showing the style of slides are extremely good, as they are from high-class drawings. This book, and also the foregoing one, have been copyrighted in England as well as the United States, where Messrs. Riley have several branches. From a correspondent in Philadelphia, we have lately learned that the former set and catalogue have met with a splendid reception.

Photographers' Diary.—This year Messrs. Letts & Co., 61, Wilson-street, Finsbury, E.C., have brought out their annual diary of much smaller size than formerly. This time it is of convenient pocket size, nicely bound and fitted with pencil. It is edited by Mr. E. J. Wall, F.R.P.S., and contains useful exposure tables and general hints; also much information regarding development of negatives, papers, etc. In addition to this there is the tourists' directory of hotels, photo dealers, and cycle repairers. There is also space for the particulars of 360 exposures, besides the usual diary space which one always expects to find. This book is a first-rate companion to photographers and cyclists.

Lime Case.—The executors of Mr. J. W. Bamford, of Yorkshire-street, Rochdale, have sent one of the new lime cases which they are introducing. The case proper is to all appearances one of the kind which has long been in use, but it is in the inner portion in which the great convenience lies, for the case is provided with a rod which acts as a borer, and at the bottom of this rod is a species of cup. Upon this rod the limes are threaded, and when one or more limes are required, the rod is simply lifted out a little and the limes removed. The cover of the bow is made six-sided, so that it may be laid on a slope and yet not roll off.



Cadett & Neall's Plates.—These plates, which are made for a variety of purposes, such as negatives, lantern slides, and photo-mechanical keep well to the fore as hitherto, and well they may, for they are of excellent quality.

"Modern Magic Lanterns and their Management." London: L. Upcott Gill, 170, Strand. Price 1s. This work is the product of Mr. Chide Bayley, Assist. Sec. to the Royal Photographic Society. On the assumption that no book of sufficient importance existed which the author could place in the hands of his lantern assistant, it appears that he decided to write one that was worthy of such, and he has certainly produced a book which enters very fully into the use of the lantern; and the why and wherefore of certain matters are well explained, although we cannot but feel that the author might have gained some more experience with regard to saturators, which he dismisses with a few words, saying that as he has had no experience with this form of light, that is sufficient reason for not dealing with the subject at any length, and in the face of this he makes the unfortunate statement that none but skilled lanternists should attempt their use—much better had he said nothing about them. Apart from this, the book contains a great deal of valuable information, and we have pleasure in recommending the major portion of it.

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Patent Intelligence.

The following list, relating to current Patent Applications, is compiled expressly for "The Optical Magic Lantern Journal" by a registered Patent Agent. For further information apply to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

No. Recent Patent Applications.

24388. 19th December, 1895. S. P. Frampton. Implements in or relating to magic lanterns.

24560. 23rd December, 1895. W. J. Spurrier. An improved method of, and apparatus for exhibiting pictures by means of an optical lantern or otherwise, parts thereof being applicable for other analogous purposes.

93. 2nd January, 1896. J. Joly. Method of mounting and storing transparent photographs.

Recently-Printed Specifications.

Copies of the following specifications may be obtained by remitting 1/- for each specification to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

10666 of 1895. Wellington. Stripping films.
24655 of 1894. Alston. Optical lantern.
182 of 1895. Wray. Kinetescope.
2195 of 1895. Houldershaw. Limelight ether saturator.
2687 of 1895. Chadwick. Projection lantern and polariscope.

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Correspondence.

CENTERING JET.

To the Editor.

Dear Sir,—In your December issue in a paper on "What Causes the Hissing of Jets," by "Lanternist," he describes a method of centering jets which he has evidently found to his satisfaction, and perhaps discovered that the next best thing to having a good jet is to be able to centre it accurately—a very necessary adjustment in good lantern work. But my object in writing is this: from the description and sketch it is identical with a centering arrangement patented, manufactured, and advertised by me (and giving satisfaction I believe all in parts of the world), would it be asking too much for an acknowledgment of the maker's name.

Yours truly,
A. KERSHAW.

Cankerwell Lane,
Leeds,

Re "PHOTOGRAPHIC TIMES."

To the Editor.

Dear Sir,—Having noticed it is stated in an English contemporary that the *Photographic Times*, owing to copyright complications is no longer obtainable in England, we ask you to be kind enough to publish the fact that such is not the case. While it is true that we no longer have an authorised English agent, yet we are open to receive subscriptions from any country.

As a special inducement to English subscribers we make no extra charge for postage, and intend in future mailing the magazine wrapped in such a manner that it will reached distant subscribers in good condition.

Yours truly,
THE PHOTOGRAPHIC TIMES PUBLISHING ASSOCIATION.
New York, U.S.A.

OIL LIGHTS.

To the Editor.

Dear Sir,—In the last journal or two there has been some remarks about the intensity of oil lights. This is a subject which interests all readers, and I hope that many will express their views upon it. That it is possible to obtain a very powerful light from oil lamps is evidenced by the fact that a number of lighthouses that are provided with oil lamps give intense light. For instance, the lighthouse at Bishop Rock (Scilly), with two eight-wick burners, gives a flash of 175,000 candles;

the Eddystone, with two six-wick burners, gives a flash of 75,000 candles; Yule Skerry, with one six-wick burner, gives a flash of 74,000 candles; and Fair Isle North, one six-wick burner, a flash of 72,000 candle-power.

Yours truly,
"HOW IS IT DONE."

To the Editor.

SIR,—In the current number of your journal there is a letter, signed Richard Morgan, with some statements which are surely at variance with the usual method of calculating the candle-power of a lamp, as during a long, practical use of the photometer, I have no recollection of ever hearing of the power all round being taken; but if so, why not above and below as well, so as to get a big value when we are at it? For instance, if we look at the flame of a standard candle from a distance of 5 feet, we are conscious of receiving, say, in one eye, a light of one candle-power, but we only receive a bundle of rays into the eye of about $\frac{3}{16}$ inch diameter, and at the same time every other $\frac{3}{16}$ inch area in the surface of a sphere of 5 feet radius, except the part cut off below by the shadow of the candle, would be equally illuminated; that is, about 1,500,000 times the area of the pupil. Therefore, the candle must give off that number of similar candle-powers. What then should the power of the candle be called; one or a million and a half? It ought to be the latter if Mr. Morgan's statement be correct; but in practice, the power of any light must of necessity be taken as the value of the illumination in one direction only at a time, as it would lead to endless confusion and most erroneous ideas if any approach to an aggregate value of the light emitted were to be attempted, except, as in the case of lighthouse illumination, where as many rays as possible are collected and combined into one parallel beam.

I am, yours truly,
GEO. H. SLIGHT.

Ashburton,
January, 1896.

HIGH-PRESSURE JETS.

To the Editor.

DEAR SIR,—I ordered a special high-pressure jet, with fine adjustment valves, instead of taps, of a maker of repute. When it was finished I had a quiet hour with it to test its capabilities, when I found that one of its specialities was, that when the valve was screwed well home, and the gas at the cylinders on, there was a leakage that caused an incandescent spot on the lime. I returned it to the maker, asking him to rectify it, when he returned it to me with the remark, that it would wear off in time. Is that right, sir? I was under the impression that a high-class jet should be perfectly gas tight.

Yours truly,
H. P. CHANDLER.

[The valves will probably close with use, but they should be right in the first instance.—ED.]

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Notes and Queries.

W. A. Palmer.—We do not know whose trade mark it is, and to search for it is hardly within our province. If you apply at the offices at Southampton Buildings, E.C., you will be allowed on payment of 1s. each quarter of an hour to search the records. On the other hand, it may not be registered at all.

Albert Lawson (*New Zealand*).—We are unable to say anything more about it than what has recently been published editorially in these pages. We believe a good apparatus can be made on this general principle, and there are now others at work upon the same sort of apparatus; so that we hope to be in a position to shortly say something definite.

Victor Pitot (*Mauritius*).—Both are 3¼ by 4¼ inches. whereas the English size is 3¼ by 3¼.

F. Smith.—If painted on top of the varnish apply turpentine first, and when all is removed allow it to remain in alcohol for a short time.

J.A.N.—You will see that we mentioned no name. It is probable that the book had reference to enhaling.

Possum.—(1) No, if it is well made. (2) Probably a slight pop, but if there was a leak there would be a flare up. (3) One is about as good as the other so long as the chill is off. (4) From the last two volumes of this journal. (5) Yes, if you take into consideration the moving about. (6) About the same. (7) Two cylinders. (8) All advertised in our columns are about the same as regards safety. (9) We hardly understand your meaning, for if, as you say, the lenses are of equal excellence, they must surely be equal as to definition.

A.R.G. asks where he can obtain one of the old style of oil Argand lamps similar to those used in lanterns years ago. *Ans.*—We do not know where you can buy a new one as they are not now made, but probably some of our readers may have such a thing as an old one by them. Try a sixpenny advertisement in our columns.

Photcmagus.—We have never tried the method spoken of by Mr. Hepworth, but it gives it very clearly, and without further information as to your want of success, would only suggest to you to see that you have a strong solution of cobaltic peroxide.

A. H. Dunning.—Messrs. Bernard, of 19, Berners-street, Oxford-street, W., publish a good shilling manual on colouring slides.

H.F.H.—A valid patent cannot be taken out for it.

A. Young Morton.—The shadow cast on the sky portion is that from the tip of the jet; you may be able to bend the tube to which the nipple is attached (if a mixed jet) a little straighter, so that the rays of light from the incandescent spot on the lime to the condenser will just clear the nipple.

Scurrilous.—Yes, we noticed Mr. Welford's observations, and will treat them with silent contempt. We do not know who owns the *Photographic Review* now, and it may be possible, as you suggest, that it is under the same proprietorship as the others, but that is none of our business.

A.T.—See Dalton's advertisement in this issue, *re* coloured lacquers.

Messrs. SOPER & STEDMAN, 147, Strand, ***write*:**

23rd January, 1896.

DEAR SIR,—We feel it our duty to write and tell you that we are more than pleased with the result of our **ADVERTISEMENT** which has been inserted in your **"OPTICAL MAGIC LANTERN JOURNAL"** for the past **TWELVE MONTHS.** We are sure you will be gratified when we tell you we have had **ORDERS** and enquiries for slides from **INDIA, SOUTH AUSTRALIA, MAURITIUS, ZAANDAM, GERMANY,** and from **ALL PARTS** of **ENGLAND, SCOTLAND** and **IRELAND.** We can only attribute these orders coming in through our advertisement in your **LANTERN JOURNAL,** which plainly shows to us that the journal in question must have a **VERY LARGE CIRCULATION ABROAD.**